

From the  
INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

FENSTER &amp; C

PCT

NOTIFICATION OF TRANSMITTAL OF  
THE INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT

(PCT Rule 71.1)

To:

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Date of mailing (day/month/year)	07.07.2003
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Applicant's or agent's file reference PEY	IMPORTANT NOTIFICATION
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International application No. PCT/L0200277	International filing date (day/month/year) 12.03.2002	Priority date (day/month/year) 12.03.2002
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Applicant HEWLETT-PACKARD INDIGO B.V.
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1. The applicant is hereby notified that this International Preliminary Examining Authority transmits herewith the international preliminary examination report and its annexes, if any, established on the international application.
2. A copy of the report and its annexes, if any, is being transmitted to the International Bureau for communication to all the elected Offices.
3. Where required by any of the elected Offices, the International Bureau will prepare an English translation of the report (but not of any annexes) and will transmit such translation to those Offices.

4. **REMINDER**

The applicant must enter the national phase before each elected Office by performing certain acts (filing translations and paying national fees) within 30 months from the priority date (or later in some Offices) (Article 39(1)) (see also the reminder sent by the International Bureau with Form PCT/IB/301).

Where a translation of the international application must be furnished to an elected Office, that translation must contain a translation of any annexes to the international preliminary examination report. It is the applicant's responsibility to prepare and furnish such translation directly to each elected Office concerned.

For further details on the applicable time limits and requirements of the elected Offices, see Volume II of the PCT Applicant's Guide.

The applicant's attention is drawn to Article 33(5), which provides that the criteria of novelty, inventive step and industrial applicability described in Article 33(2) to (4) merely serve the purposes of international preliminary examination and that "any Contracting State may apply additional or different criteria for the purposes of deciding whether, in that State, the claimed inventions is patentable or not" (see also Article 27(5)). Such additional criteria may relate, for example, to exemptions from patentability, requirements for enabling disclosure, clarity and support for the claims.

Name and mailing address of the international  
preliminary examining authority:



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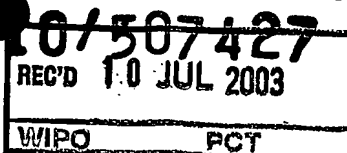
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# INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)





Applicant's or agent's file reference <b>PEY</b>	<b>FOR FURTHER ACTION</b> See Notification of Transmittal of International Preliminary Examination Report (Form PCT/PEA/416)	
International application No. <b>PCT/IL02/00277</b>	International filing date (day/month/year) <b>12.03.2002</b>	Priority date (day/month/year) <b>12.03.2002</b>
International Patent Classification (IPC) or both national classification and IPC <b>B41J2/45</b>		
Applicant <b>HEWLETT-PACKARD INDIGO B.V.</b>		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 5 sheets, including this cover sheet.  
  
☒ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of 4 sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the opinion
- II ☐ Priority
- III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☐ Certain defects in the international application
- VIII ☐ Certain observations on the international application

Date of submission of the demand  <b>19.12.2002</b>	Date of completion of this report  <b>07.07.2003</b>
Name and mailing address of the International preliminary examining authority:   <b>European Patent Office</b> <b>D-80298 Munich</b> <b>Tel. +49 89 2399 - 0 Tx: 523656 epmu d</b> <b>Fax: +49 89 2399 - 4465</b>	Authorized Officer  <b>Findeli, B</b>  Telephone No. +49 89 2399-2372  

**INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT**

International application No. **PCT/IL02/00277**

**I. Basis of the report**

1. With regard to the **elements** of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)*):

**Description, Pages**

1-12 as originally filed

**Claims, Numbers**

1-33 filed with telefax on 29.04.2003

**Drawings, Sheets**

1/3-3/3 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
- ☐ the claims, Nos.:
- ☐ the drawings, sheets:

**INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT**

International application No. **PCT/IL02/00277**

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5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)).

*(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)*

6. Additional observations, if necessary:

**V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

1. Statement

Novelty (N)	Yes: Claims	1-33
	No: Claims	
Inventive step (IS)	Yes: Claims	1-33
	No: Claims	
Industrial applicability (IA)	Yes: Claims	1-33
	No: Claims	

2. Citations and explanations

**see separate sheet**

- 1) Claim 1 is directed to an apparatus for exposing **in a binary manner** a photoreceptive surface having a width and having a relative movement with an irradiator in a direction perpendicular to the width, comprising:
- an irradiator comprising a plurality of rows of substantially identical light sources, each said row of light sources having an axis generally directed along said width, said rows being spaced in a direction generally perpendicular to said width to form a generally rectangular array of light sources; and
  - a controller that controls activation of the light sources to selectively irradiate portions of said photoreceptive surface to form a latent image thereon during relative motion, using fewer than all of the light sources available for illuminating a pixel to be printed;
- wherein the controller controls the activation of the light sources such that at least some pixels in a row are exposed utilizing light sources from different rows of light sources.

Such an apparatus is known from the closest prior art recited in page 1 of this application.

The subject-matter of claim 1 differs from the apparatus disclosed in the closest prior art in that the controller controls the light sources such that each of said pixels to be printed that is irradiated is exposed to a same amount of light.

The distinguishing features result in breaking-up visual patterns that may result from variations in characteristics of the sources, and in averaging out the characteristics of the sources.

The technical problem to be solved by the application was therefore to reduce artifacts due to sources variations.

The solution to this problem is neither disclosed, nor suggested in the prior art cited in the search report.

- 2) Claim 26 is directed to a method, the steps thereof corresponding to the features of claim 1, but expressed in terms of method steps. Therefore, the arguments brought forward in the previous paragraph 1 are also applicable by analogy to the subject-matter of claim 26.

**INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT - SEPARATE SHEET**

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International application No. PCT/IL02/00277

- 3) The dependent claims define further embodiments of the apparatus and of the method, and likewise meet the requirements of the PCT.

PEY A02

## CLAIMS

1. Apparatus for exposing, in a binary manner, a photoreceptive surface having a width and having relative movement with an irradiator in a direction perpendicular to the width,  
5 comprising:

an irradiator comprising a plurality of rows of substantially identical light sources, each said row of light sources having an axis generally directed along said width, said rows being spaced in a direction generally perpendicular to said width to form a generally rectangular array of light sources; and

10 a controller that controls activation of the light sources to selectively irradiate portions of said photoreceptive surface to form a latent image thereon during said relative motion, using fewer than all of the light sources available for illuminating a pixel to be printed,

wherein the controller controls the activation of the light sources such that at least some pixels in a row are exposed utilizing light sources from different rows of light sources;

15 characterized in that the controller controls the light sources such that each of said pixels to be printed that is irradiated is exposed to a same amount of light.

2. Apparatus according to claim 1, wherein when rows of pixels to be printed are each illuminated by two rows of light sources, one row of light sources illuminating pixels on one  
20 end of a row of pixels and a second row of light sources illuminating pixels on the other end of the row of pixels, with both rows illuminating pixels in an overlap region of the row of pixels to be printed, wherein light sources outside the overlap region are controlled by said controller such that each of said pixels to be printed that is irradiated is exposed to a same amount of light.

25 3. Apparatus according to claim 1 wherein the light sources comprise light emitting diodes.

4. Apparatus according to claim 1 or claim 3, wherein each row of said plurality of rows  
30 of light sources are on a different print head.

5. Apparatus according to any of claims 1-4, wherein more than one of said plurality of rows of light sources are on a single print head.

PEY A02

6. Apparatus according to any of claims 1-4, wherein all of said plurality of rows of light sources are on a single print head.
7. Apparatus according to claim 5 or claim 6 wherein at least two of said plurality of rows are formed on a monolithic substrate.
8. Apparatus according to any of the preceding claims wherein said plurality of rows comprises fewer than four rows.
9. Apparatus according to any of claims 1-7 wherein said plurality of rows comprises between five and nine rows.
10. Apparatus according to any of claims 1-7 wherein said plurality of rows comprises ten of more rows.
11. Apparatus according to any of the preceding claims wherein said controller is operative to expose pixels along a column of pixels utilizing a light source situated in said column chosen in a random or quasi-random manner.
12. Apparatus according to any of claims 1-10, wherein said light sources are chosen in accordance with a fixed repeat.
13. Apparatus according to claim 12 wherein the light sources from which the exposing light sources are chosen, comprise a set of light sources, chosen to minimize artifacts.
14. Apparatus according to any of the preceding claims wherein said controller is operative to expose pixels along a column of pixels utilizing a plurality of light sources situated in said column.
15. Apparatus according to any of the preceding claims and including a motor that provides motion of said photoreceptor.



PEY A02

16. Apparatus according to any of the preceding claims and including a position sensor that provides an indication of position of said photoreceptor with respect to said rows of light sources.

17. Apparatus according to claim 16 wherein said controller activates said light sources, responsive to said indication of position.

18. Apparatus according to claim any of the preceding claims wherein the photoreceptive surface is a charged photoconductive surface and wherein exposure to light of the light sources selectively discharges the surface.

19. Printing apparatus comprising:

apparatus according to claim 18; and

a developer that develops the latent image with a colored toner to form a developed image thereon;

said printing apparatus including a transfer station at which said developed image is transferred to a final substrate.

20. Apparatus according to claim 19 wherein the colored toner is a powdered toner.

21. Apparatus according to claim 19 wherein the colored toner is a liquid toner.

22. Apparatus according to any of claims 1-18 wherein the photoreceptor is a photosurface and wherein exposure from said light sources forms a latent image in said photosurface that can be chemically developed to form a visible image.

23. Photo-printing apparatus, comprising:

a latent image forming device for a photosurface according to claim 22; and

a developer that chemically develops the latent image to form a visible image.

24. Photo-printing apparatus, comprising:

a plurality of latent image forming devices for a photosurface according to claim 24; each said device emitting light of a different color; and

a developer that chemically develops the latent image to form a visible image.

PEY A02

25. Apparatus according to claim 24, wherein the colors include red, green and blue.
26. A method of pixelized image formation on a photosensitive surface, comprising:  
5 providing relative motion of the photosensitive surface relative to a multiplicity of light sources, such that pixels to be printed on the surface pass a plurality of said light sources; and  
exposing a plurality of the pixels to be printed of the surface to more than one, but fewer than the plurality, of said light sources, characterized in that the exposure of the exposed pixels to be printed is the same.
- 10 27. A method according to claim 26, wherein when rows of pixels to be printed are each illuminated by two rows of light sources, one row of light sources illuminating pixels on one end of a row of pixels and a second row of light sources illuminating pixels on the other end of the row of pixels, with both rows illuminating pixels in an overlap region of the row of pixels  
15 to be printed, wherein light sources outside the overlap region are exposed to a same amount of light.
28. A method according to claim 26 wherein the at least one pixel is exposed to one or more of the light sources chosen randomly or quasi-randomly.
- 20 29. A method according to claim 26 wherein said one or more light sources is chosen in accordance to a predetermined repeat to reduce visual artifacts.
30. A method according to any of claims 26-29 wherein a plurality of pixels are exposed in  
25 accordance with the method.
31. A method according to any of claims 26-30, wherein the image thus formed is a latent image and including developing the latent image to form a visible image.
- 30 32. A method according to claim 31 wherein said developing comprises contacting the surface with a toner.
33. A method according to claim 31 wherein developing comprises chemical development.